

WHAT IS CLAIMED IS:

1. A method for producing nitrogen trifluoride through direct contact of a fused ammonium fluoride salt with fluorine gas, comprising forming a stream of micro droplets of the fused ammonium fluoride salt by rapidly ejecting the fused ammonium fluoride salt into a reactor through a nozzle while circulating the fused ammonium fluoride salt from a lower portion to an upper portion of the reactor; and contacting micro droplets of the fused ammonium fluoride salt with fluorine gas sucked into the reactor through a suction pipe for fluorine gas by a negative pressure formed around the nozzle due to an ejection of the fused ammonium fluoride salt.

2. The method for producing nitrogen trifluoride according to claim 1, wherein fluorine gas is periodically or intermittently isolated and ammonia gas is sucked in the reactor so as to reproduce the ammonium fluoride salt through the contact of ammonia gas with a stream of micro droplets of the fused ammonium fluoride salt, thereby maintaining a ratio of  $\text{HF}/\text{NH}_3$  at a constant level.

3. The method for producing nitrogen trifluoride according to claim 1, wherein fluorine gas introduced into the reactor through the suction pipe for fluorine gas is diluted with mixed gases containing  $\text{NF}_3$  in the reactor by connecting the upper portion of the reactor with the

suction pipe for fluorine gas using a tube.

4. The method for producing nitrogen trifluoride according to claim 1, wherein a portion of the fused ammonium fluoride salt in the reactor for nitrogen trifluoride production is transferred to another jet-loop reactor (reproduction reactor), and the fused ammonium fluoride salt is rapidly ejected into the reproduction reactor through a nozzle, while being circulated from a lower portion to an upper portion of the reproduction reactor, so that a stream of micro droplets of the fused ammonium fluoride salt is contacted with ammonia gas sucked into the reactor by a negative pressure formed around the nozzle due to an ejection of the fused ammonium fluoride salt, thereby continuously producing nitrogen trifluoride with continuously reproducing the fused ammonium fluoride salt and recycling the fused ammonium fluoride salt reproduced into the reactor for nitrogen trifluoride production.

5. The method for producing nitrogen trifluoride according to claim 1, wherein the reactor includes a jet ejector pipe having nozzles, which has 5~25 of a ratio of the cross sectional area of a throat to the total cross sectional area of nozzles.

6. The method for producing nitrogen trifluoride according to claim 1, wherein an ejecting linear velocity

of the fused ammonium fluoride salt at the nozzle is 2~30m/sec.

7. The method for producing nitrogen trifluoride according to claim 1, wherein an ejecting linear velocity of the fused ammonium fluoride salt at the nozzle is 5~20m/sec.

8. The method for producing nitrogen trifluoride according to claim 1, wherein the fused ammonium fluoride salt and fluorine gas are reacted with each other at a temperature of 100~150°C.

9. The method for producing nitrogen trifluoride according to claim 1, wherein the fused ammonium fluoride salt and fluorine gas are reacted with each other at a temperature of 110~130°C.

10. The method for producing nitrogen trifluoride according to claim 2, wherein the fused ammonium fluoride salt and ammonia gas are reacted with each other at a temperature of 70~150°C.

11. The method for producing nitrogen trifluoride according to claim 4, wherein the fused ammonium fluoride salt and ammonia gas are reacted with each other at a temperature of 70~150°C.

12. The method for producing nitrogen trifluoride according to claim 2, wherein the fused ammonium fluoride salt and ammonia gas are reacted with each other at a temperature of 90~120°C.

13. The method for producing nitrogen trifluoride according to claim 4, wherein the fused ammonium fluoride salt and ammonia gas are reacted with each other at a temperature of 90~120°C.